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A REVIEW OF THE HYPOSTOMIDE AND LOPHOBRANCHIATE FISHES OF JAPAN.

BY

DAVID STARR JORDAN

AND

JOHN OTTERBEIN SNYDER,

Of the Leland Stanford Junior University.

From the Proceedings of the United States National Museum, Vol. XXIV, pages 1-20 (with Plates I-XII).

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A REVIEW OF THE HYPOSTOMIDE AND LOPHOBRANCHIATE FISHES OF JAPAN.

By David Starr Jordan and John Otterbein Snyder,
Of the Leland Stanford Junior University.

The present paper contains a review of the Hypostomide and Lophobranchiate fishes of Japan, the families Pegasidæ, Solenostomidæ, Syngnathidæ, and Pegasidæ. It is based on specimens obtained in Japan by the authors in the summer of 1900, a series of duplicates being in the United States National Museum, and upon the collection of Japanese fishes in the United States National Museum, as well as upon specimens collected by the United States Fish Commission Steamer *Albatross*.

In this work we have had the efficient aid of Mr. Michitaro Sindo, who has carefully compared and measured all the recorded specimens.

Suborder HYPOSTOMIDES.

Body covered with bony plates, anchylosed on the trunk, movable on the tail. Gill cover formed by a large plate corresponding to the opercle, preopercle, and subopercle. One rudimentary branchiostegal. Gills four, lamellated. Ventral fins abdominal. Dorsal and anal short, of soft rays only. No pseudobranchiæ or air-bladder. This group contains a single family; fantastic little fishes of the Asiatic seas.

(ὑπό, below; στόμα, mouth.)

Family 1. PEGASIDÆ.

Body broad, much depressed, covered with bony plates; mouth small, below a prolonged snout, its margin formed by the premaxillaries; no teeth; suborbital ring well developed, forming a suture with the gill cover. Pectorals broad, very large, placed horizontally; ventrals well behind the pectorals, not far from the vent, of one or two rays, one of them very long; tail four angled, the short dorsal

and anal placed on it opposite to each other. Caudal small. Vertebræ few; no ribs. Intestinal canal short. East Indies.

a. Pectoral[1] rays equally slender, none of them spine-like; tail short, of stout rings, not tapering and flattened posteriorly ..... *Zalises.* 1

1. ZALISES Jordan and Snyder, new genus

Zalises JORDAN and SNYDER, new genus (draconis).

The genus contains those species of *Pegasidæ* which have the tail short and not attenuate and compressed toward the tip, and in which the pectoral rays are all slender and simple, none of them spine-like. East Indies. (ζάλη, surf; σής, moth.)

1. ZALISES UMITENGU Jordan and Snyder, new species.

UMITENGU.

(Plates I, II.)

Pegasus draconis ISHIKAWA, Prel. Cat., 1897, p. 5, Boshu Kii (not of Linnæus).

Head $2\frac{4}{5}$ in length; width, posterior to pectorals, $3\frac{1}{2}$. D. 5; A. 5; P. 10; V. 2. Vent midway between front of eye and base of caudal fin. Tail of 8 rings. Trunk gibbous, the median depressed part divided by three cross-ridges; obtuse tubercles at the meeting points of the lengthwise and cross ridges of the back; nape with two deep pits; first, second, fourth, and fifth tail rings each with a compressed spine directed backward; pectoral 3 in body, as long as from tip of snout to nuchal pits; fifth pectoral ray not enlarged; snout prolonged, longer than in any other species, its length from eye 5 in body, the part before the mouth more than twice as long as broad, with a finely serrated edge on the dilated blade on each side; distance from middle of shoulder girdle to tip of snout, $2\frac{3}{4}$ in total length ($3\frac{1}{4}$ in *P. draconis*).

Color brownish, finely marked with darker. The snout and the last two caudal rays black; pectoral with fine brown dots on the rays, the outer part of the fin paler.

Seas of Japan, here described from a dried specimen, 75 millimeters long, from the province of Kii (Wakanoura), presented by the Imperial Museum of Tokyo.

Type.—No. 6518, Leland Stanford Junior University Museum.

The species closely resembles *P. draconis* of the East Indies, but differs from descriptions and figures in the longer and narrower snout, and rather longer tail. Other specimens supposed to be the same are in the collection from Boshu (near Misaki), and another from Kii.

(*Umi*, sea; *Tengu*, a long-nosed god of a humorous nature, in Japanese mythology.)

[1] The fifth pectoral ray is enlarged and spine-like in the genus *Pegasus* (*P. volitans* Linnæus). The tail is elongate, the posterior rings flattened and compressed in the genus *Parapegasus* Duméril, type, *P. natans* Bloch.

Order LOPHOBRANCHII.

THE LOPHOBRANCHS.

Gills tufted, not laminated, composed of small rounded lobes attached to the gill arches. Interclavicles well developed. Scapula suspended to the cranium by a post-temporal. Superior branchihyals and pharyngeals, and basal branchihyals wanting or not ossified. Mouth very small, bounded above by the premaxillaries. Post-temporal simple, coössified with the cranium; basis of the cranium simple. Pectoral fins with elevated bases. Anterior vertebræ modified, the diapophyses much expanded. Air bladder simple, without air duct. Snout produced, bearing the small toothless mouth at the end. Gill covers reduced to a large simple plate. Skin with bony plates. Muscular system little developed.

(λόφος, crest; βράγχ, gill.)

FAMILIES OF LOPHOBRANCHII.

a. Spinous and soft dorsal present; ventral fins present; gill openings wide. SOLENOSTOMIDÆ. 2

aa. Spinous dorsal fin wanting; no ventral fins; gill openings narrow. SYNGNATHIDÆ. 3

Family 2. SOLENOSTOMIDÆ.

Body compressed, the tail very short, the snout long, compressed. All parts covered with thin skin, below which is the dermal skeleton with star-like ossifications. Spinous dorsal short; soft dorsal and anal long, with elevated base; caudal long. Ventrals close together, inserted opposite spinous dorsal, each of seven rays; the fins free in the male; in the female adnate to the body forming a large pouch for the reception of the eggs. Branchiostegals 4, very thin. Intestinal canal very simple. Singular fishes of the East Indies, constituting a single genus.

2. SOLENOSTOMUS Lacépède.

Solenostomus LACÉPÈDE, Hist. Nat. Poiss., V, 1803, p. 36 (*paradoxus.*)

Characters of the genus included above. (σωλήν, razor; στόμα, mouth.)

a. Snout rather stout, its median depth 4½ in its length; color pink, everywhere with fine brown spots; first dorsal with two large ovate black spots; caudal with smaller spots ..... *cyanopterus.* 2

aa. Snout elongate, its median depth 6½ in its length; color brownish, irregularly mottled with orange; membrane of dorsal and caudal blotched with darker, the spots on first and second membranes of dorsal most distinct .. *paradoxus.* 3

2. SOLENOSTOMUS CYANOPTERUS (Bleeker).

(Plate III.)

Solenostomus paradoxus BLEEKER, Nat. Tyds. Ned. Ind., III, p. 308, Hawaii, Ceram.—KAUP, Lophobranchiates, 1856, p. 2, Ile of France, India, New Guinea (not of Pallas).

Solenostoma cyanopterum BLEEKER, Nat. Hist. Ned. Ind., VI, p. 506, Hawaii, Ceram.—GÜNTHER, Fishes of Zanzibar, p. 137, pl. xx, figs. 2, 3, Zanzibar; Cat. Fish., VIII, 1870, p. 151, Zanzibar, Ceram, China.—DUMÉRIL, Hist. Poiss., II, 1870, p. 497, New Guinea.

Head $2\frac{1}{5}$ in length; depth 5. D. V.–20; P. 27; V. 7; A. 19; C. 15. Depth of snout at middle $4\frac{1}{2}$ in its length. Eye $6\frac{1}{4}$ in snout; dorsal spines 2 in head; ventral equal to snout or a little more; caudal a little shorter than head. Caudal peduncle shorter than base of second dorsal. Color pink, with small black dots like ink specks, scattered over head and upper part of body; eye red; fins pale, the spinous dorsal with two long black ocelli (said to be dark blue in life) on membranes of first and second spines, besides black dots, caudal with small inky spots like those on body, but more elongate, several of them drawn out into lines.

Japan to Zanzibar, occasionally northward in the Kuro Shiwo, doubtfully recorded from Hawaii. Known in Japan from a single adult female, taken at Boshu (Awa) by Dr. Kishinouye, and by him presented to Stanford University.

(κυάνεος, blue; πτερόν, fin.)

3. SOLENOSTOMUS PARADOXUS (Pallas).

(Plate IV.)

Fistularia paradoxa PALLAS, Spicilegia, VIII, p. 32, pl. IV, fig. 6, Amboyna.—SCHNEIDER, Syst. Ichth., 1807, p. 114, pl. XXX, fig. 1 (copied).

Solenostomus paradoxus LACÉPÈDE, Hist. Nat. Poiss., V, 1803, p. 36, copied.—RICHARDSON, Ichth. China, 1846, p. 203, Canton, after Chinese drawings.—DUMÉRIL, Hist. Poiss., II, 1870, p. 497, Mauritius.

Solenostoma paradoxa GÜNTHER, Cat. Fish., VIII, 1870, p. 152, Amboyna.

Head $2\frac{2}{5}$ in length; depth $5\frac{1}{4}$. D. V.–21; P. 24; V. 7; A. 22. Depth of snout at its middle $6\frac{1}{2}$ in length. Eye 7 in snout; dorsal spines $1\frac{4}{5}$ in head; ventrals a little longer than snout; caudal a little longer than head; caudal peduncle a little more than 2 in base of second dorsal.

Color light brown, with irregular oblong spots of orange brown, each with a paler center, one series of these forming an irregular stripe from eye to caudal; some darker blotches on snout and on ventrals; two dark blotches with pale center between the dorsal fins; an oblong blackish blotch on each membrane of spinous dorsal, the first two most distinct, besides numerous other blotches; soft dorsal and anal mottled; caudal clouded with blackish.

East Indies, north in the Kuro Shiwo to Japan. One fine adult female specimen presented to us by Dr. K. Kishinouye, taken at Boshu (Awa) with the preceding species. It is not certain that this species is the original *paradoxus* of Pallas, but it is obviously nearer to it than the preceding.

(παράδοξος, paradox.)

Family 3. SYNGNATHIDÆ.

THE PIPE FISHES.

Body elongate, usually slender, covered with bony plates which are firmly connected, forming a bony carapace. Head slender, the snout long, tube-like, bearing the short toothless jaws at the end. Gill openings reduced to a small aperture behind the upper part of the opercle. Tail long, prehensile or not, usually provided with a small caudal fin. Male fishes with an egg pouch, usually placed on the under side of the tail, sometimes on the abdomen, commonly formed of two folds of skin which meet on the median line. The eggs are received into this pouch and retained until sometime after hatching, when the pouch opens, permitting the young to escape. Dorsal fin single, nearly median, of soft rays only; pectorals small, or wanting; ventrals, none; anal fin minute, usually present. Small fishes, found in all warm seas, sometimes entering fresh waters.

Syngnathinæ:

a. Tail not prehensile, usually with a caudal fin; axis of head usually in line with axis of body.
- *b.* Humeral bones united.
  - *c.* Pectoral fins present; caudal present.
    - *d.* Male with the egg pouch under the tail, formed by lateral membranes which become connected along the middle, forming a closed pouch.
      - *e.* Dorsal fin inserted over or just before the vent.
        - *f.* Base of the dorsal fin not raised above the level of the back.
          - *g.* Opercle not crossed by a horizontal ridge; form slender. *Syngnathus.* 3.
          - *gg.* Opercle crossed by a horizontal ridge; form rather robust, the keels high ..... *Corythroichthys.* 4.
        - *ff.* Base of dorsal fin raised above the level of the back.
          - *h.* Snout elongate, not serrated nor spinulose; body slender; opercle without ridge ..... *Yozia.* 5.
          - *hh.* Snout short, rough or serrate above.
            - *i.* Opercle without prominent ridge; body slender, without fleshy flaps ..... *Trachyrhamphus.* 6
            - *ii.* Opercle with a prominent ridge; body stout, with fleshy flaps; forehead elevated; nape crested ..... *Halicampus.* 7.
      - *ee.* Dorsal fin placed at a considerable distance behind the vent; pectoral and caudal fins very small; base of dorsal not elevated. *Urocampus.* 8.

Hippocampinæ:

aa. Tail prehensile; caudal fin small; head shaped like that of a horse, placed at a large angle with axis of body; egg pouch at base of tail.

i. Body depressed; shields smooth ..... *Gasterotokeus.* 9.

ii. Body compressed.

j. Occiput without coronet; shields without tubercles. *Acentronura.* 10.

jj. Occiput with a narrow bony crest, surmounted by a coronet; shields with tubercles or spines ... *Hippocampus.* 11.

3. SYNGNATHUS[1] Linnaeus.

Syngnathus LINNAEUS, Syst. Nat., 10th ed., 1758, p. 337 (*acus*).
Siphostoma RAFINESQUE, Caratteri Nuovi Generi, 1810, p. 18 (*pelagicus*).
Syngnathus SWAINSON, Nat. Hist. Class'n. Anim., II, 1839, p. 332 (*acus*), and of authors generally; not of Linnaeus, as first restricted by Rafinesque.
Dermatostethus GILL, Proc. Ac. Nat. Sci. Phila., 1862, p. 283 (*punctipinnis*).

Body elongate, very slender, 6 or 7 angled, not compressed, tapering into a very long tail; the dorsal keels of the trunk not continuous with those of the tail. Head slender, tapering into a long tube-like, subterete snout, which bears the very short, toothless jaws at the end. Opercle without distinct ridge. Humeral bones firmly united with the "breast ring." Body covered with a series of bony, keeled, radiated plates, arranged in linear series. Dorsal fin distinct, rather short, inserted before or after the vent, which is near the middle of the body, its base not elevated above line of back; caudal fin present, rather small; anal fin minute, close behind vent; pectorals developed, short and rather broad. Male fishes with an egg pouch along the under side of the tail, formed by two cutaneous folds, and splitting lengthwise to release the young fishes. Species very numerous, inhabiting all warm seas; abounding in bays among the seaweeds, and entering the rivers. The females in most species are deeper than the males, with more robust trunk, with longer snout, and a more distinct ventral keel.

(σύν, together; γνάθος, jaw.)

a. Snout slender, 1½ in head; body rings about 19 + 40; dorsal rays about 37; body slender; coloration plain ..... *schlegeli.* 4.

[1] The genus *Syngnathus* of Linnaeus, originally equivalent to the modern family of *Syngnathidæ*, was first subdivided by Rafinesque in 1810. The name *Siphostoma* was given to *S. pelagicus* and its relatives, the *Syngnathus* of late writers; that of *Tiphle* to *S. typhle*, the *Siphonostoma* of late writers; while *Syngnathus* was retained for *S. aequoreus* and its relatives, the group now usually called *Nerophis*, the type of *Nerophis* being *Syngnathus ophidion* Linnaeus. This arrangement has been previously adopted by us, but it is open to two very serious objections besides the fact that it is contrary to the general usage, which makes *acus* the type of *Syngnathus*, in accordance with Swainson's arrangement. These objections are (1) that Artedi, from whom Linnaeus accepted the genus *Syngnathus*, did not know of the existence of *Syngnathus æquoreus*, and (2) the statement of Linnaeus (which we have been unable to verify), that the type of each of his genera is the "best known European or officinal species." *Syngnathus acus* would meet this requirement, but not *Syngnathus æquoreus*, which had not then been found in Europe.

4. SYNGNATHUS SCHLEGELI (Kaup).

YOJI-UWO (CHOPSTICK OR TOOTHPICK FISH).

Syngnathus tenuirostris SCHLEGEL, Fauna Japonica, Poiss., 1847, p. 273, pl. CXX, fig. 5, Nagasaki (not of Rathke).

Syngnathus schlegeli[1] KAUP, Lophobr., 1856, p. 46, Nagasaki, after Schlegel.—DUMÉRIL, Hist. Poiss., II, 1870, p. 554.

Siphostoma schlegeli JORDAN and SNYDER, Proc. U. S. Nat. Mus., XXIII, 1901, p. 350, Tokyo.

Syngnathus griseolineatus ISHIKAWA, Prel. Cat., 1897, p. 5, Kagoshima (not of Ayres).

Head $2\frac{1}{4}$ to $2\frac{1}{3}$ in trunk; head and trunk $1\frac{1}{5}$ to $1\frac{2}{5}$ in tail; rings 19 + 40 (18 to 20 + 39 to 43); dorsal rays 37 (35 to 41). Snout slender, $1\frac{3}{5}$ in head ($1\frac{2}{5}$ to $1\frac{2}{3}$). Egg pouch $1\frac{2}{3}$ to $1\frac{3}{5}$ in tail. Dorsal inserted opposite the vent, or very slightly in advance of it, covering 8 or 9 rings; depth of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in head. The specimens from Aomori are more slender, the depth 5 to 6 in head.

Color light or dark brownish, frequently with small whitish dots.

Bays of Japan. Exceedingly common from Hokkaido to Nagasaki. Our many specimens from Otaru, Mororan, Hakodate, Aomori, Matsushima, Tokyo, Misaki, Wakanoura, Tsuruga, and Onomichi. Northern examples are slightly slenderer, with rather longer snout, and the number of rings more often approaches the maximum. No tangible distinction is, however, apparent. (Named for Professor Schlegel, of Leyden, the learned author of the volume on fishes in the Fauna Japonica.)

4. CORYTHROICHTHYS Kaup.

Corythroichthys KAUP, Lophobranchiates, 1856, p. 25 (*albirostris*).

This genus is composed of stout-bodied roughish pipe-fishes, in which the opercle is crossed by a horizontal ridge, and the base of the dorsal fin is not elevated. Top of head keeled; dorsal rays and body rings rather few. Tropical.

(κορύθρος, crown; ἰχθύς, fish.)

a. Snout short, about 2 in head; body rings about 17 + 35; dorsal rays about 29; body robust with marked angles; color olive, with dark bars; sides of head with black streaks; throat with black bars.....*isigakius*. 5.

5. CORYTHROICHTHYS ISIGAKIUS Jordan and Snyder, new species.

(Plate V.)

Head $7\frac{1}{4}$ in length; $2\frac{1}{3}$ in trunk; depth $2\frac{1}{2}$ in head; snout $2\frac{1}{5}$; eye 5; dorsal 27, on 6 rings; anal 4; rings 16+35.

Body short, rather thick; snout very slender, about as long as rest of head, straight, subterete in form and not serrate; a crest on each

[1] *Syngnathus schlegeli* Gunther, from China, seems to be a different fish. D. 40; osseous rings 19 + 44 to 46; tail more than thrice length of trunk, etc.

side of head above eyes; interorbital space deeply concave; a prominent median crest of 3 lobes; opercle with a keel and a covered ridge above it; ridges of body strongly developed; neither the dorsal nor the lateral keels of body connected with dorsal keels of tail.

Dorsal inserted just posterior to anal opening; caudal contained 3 times in head.

Color light gray, with numerous diffuse dark cross bands, arranged in pairs, a black dot at edge of each plate on dorsal keel; sides of head with three black longitudinal streaks, the lowest below eye; throat below with a black median streak, behind which are three black cross bars, these bars wanting in one specimen. Described from the type, No. 6519, Leland Stanford Junior University collection, taken at Yaeyama, Ishigaki Island, Riukiu group, by Capt. Alan Owston.

Other examples from the same locality measure as follows: Head $2\frac{1}{6}$ to $2\frac{2}{3}$ in trunk; head and trunk $1\frac{1}{5}$ to $1\frac{1}{2}$ in tail; rings 16+34 to 36; D. 27 to 29. Length 110 to 150 millimeters.

(*Ishigaki*, stone-fence in Japanese.)

5. YOZIA Jordan and Snyder, new genus.

Yozia Jordan and Snyder, new genus (*wakanouræ*).

This genus is closely allied to *Trachyrhamphus*, with which it agrees in the elevated base of the dorsal fin. The snout is, however, essentially as in *Syngnathus*, elongate and without serrations above.

(*Yoji-uwo*, or toothpick fish, the Japanese name for all pipe-fishes.)

6. YOZIA WAKANOURÆ Jordan and Snyder, new species.

(Plate VI.)

? *Syngnathus coarctatus* Bleeker, Fischf. Amboyna, 1857, p. 99, Amboyna.—Duméril, Hist. Poiss, II, 1870, p. 569, Amboyna.

? *Syngnathus zanzibarensis* Günther, Fishes Zanzibar, 1866, p. 140, pl. xx, fig. 5, Zanzibar; Coll. Lieut. Playfair; Cat. Fish., VIII, 1870, p. 168, Zanzibar, China.

Head $2\frac{4}{5}$ in trunk; head and trunk $1\frac{4}{5}$ in tail; rings 24+59. D. 27; P. 16; C. 5. Snout more than half head, equal to distance from front of eye to posterior edge of front ring, which is very near tip of pectoral. Eye 4 in snout, 2 in postorbital space. Snout slender, its upper edge smooth. Interorbital space rather broad, concave; occiput and nape with a low, roughish median ridge, or keel, posteriorly; a low keel above opercle; trunk rather deeper than broad, slightly swollen at the middle under the elevated base of dorsal fin; depth of body $4\frac{1}{2}$ in head, 47 in total length. No spines. Vent below middle of dorsal, which stands on six rings.

Color very dark brown, with lighter and darker marblings.

One female specimen, 265 millimeters long, taken by Jordan and Snyder at Wakanoura. (Type, No. 6517, Leland Stanford Junior University Museum.) We describe it as new with some doubt, as the East Indian forms *coarctata* and *zanzibarensis* are very close to it.

It agrees very closely with Dr. Günther's account of *zanzibarensis*, notwithstanding the wide difference in locality. From Duméril's account of *coarctata* it differs in the slightly longer snout and greater nuchal keel. Duméril regards *Zanzibarensis* as identical with *Syngnathus coarctatus* from Amboyna, which may be correct. In *Y. coarctata* the rings are 22 + 59 to 63; D. 30; P. 19; occiput not keeled.

6. TRACHYRHAMPHUS Kaup.

Trachyrhamphus KAUP, Lophobranchiates, 1856, p. 23 (*serratus* Kaup, not of Schlegel.)

This genus is very close to *Syngnathus*, from which it differs in having the base of the dorsal elevated, forming a slight protuberance on the back, and in having the upper edge of the snout serrated. Japan.
(τραχύς, rough; ῥάμφος, snout.)

7. TRACHYRHAMPHUS SERRATUS (Schlegel).

Syngnathus serratus SCHLEGEL, Fauna Japonica, Poiss., 1847, p. 272, pl. CXX, fig. 4, Nagasaki.—BLEEKER, Verh. Bat. Gen., Nalez, XXV, p. 55, Japan.—GÜNTHER, Cat. Fishes, VIII, 1870, p. 167, North China, Siam.—DUMERIL, Hist. Poiss., II, 1870, p. 538, Macao.—DAY, Fishes of India, p. 677, pl. CLXXIII, fig. 4.—NYSTROM, Handl. Svensk. Vet. Akad., 1887, p. 47, Nagasaki.—DAY, Fish. Brit. India, II, p. 461.

Trachyrhamphus cultrirostris PETERS, Monatsber, Ak. Wiss. Berlin, 1869, p. 710 (said to be a young example).

Head 4 to 4½ in trunk; head and trunk 1⅔ in tail. Rings 23 or 24+ 46 to 48. Dorsal rays 26 to 28; pectoral 15 or 16; caudal 9. Snout 2½ in head. Eye 1⅘ in snout, 2 in postorbital part of head.

Snout strongly serrated above, on its basal two-thirds. Interorbital space broad, with the orbital ridges prominent, smooth; occiput and nape with a median ridge. Opercle finely radiated. Lateral line bent downward, passing into the edge of abdomen. Body scarcely deeper than broad; shields without spines. Vent nearly below middle of dorsal fin, which stands on six rings. Base of dorsal elevated; egg pouch 1⅘ to 2 in tail. Color dark brown, plates with paler edges; body faintly banded in rings; neck below with dark cross-bands. Length about 300 millimeters.

Coasts of Japan and China; rather common. Known to us from numerous specimens from Yokohama, Wakanoura, and Nagasaki; the present description from specimens from Wakanoura.
(*Serratus*, serrate.)

7. HALICAMPUS Kaup.

Halicampus KAUP, Lophobranchii, 1856, p. 22, (*conspicillatus* Kaup, not of Jenyns.)

This genus agrees with *Trachyrhamphus* in the serrated snout and in the elevated base of the dorsal fin. The snout is thin and short, set

with rows of small spines distinctly separated from the high forehead and elevated orbits. Nape and breast with comb-like crest. Dorsal fin short. Angles of body rough, furnished with fleshy tags. East Indies.

(ἅλς, sea; κάμπος, caterpillar.)

8. HALICAMPUS KOILOMATODON (Bleeker).

Halicampus conspicillatus KAUP, Lophobr., 1856, p. 22, "India," New Holland (not of Jenyns).

Halicampus grayi KAUP, Manuscript British Museum, "India," (noted by Kaup in synonymy).

Syngnathus koilomatodon BLEEKER, Act. Soc. Sci. Indo-Nederl., Japan, V. p. 10, pl. I, fig. 1, Nagasaki. Specimen 4 inches long.

Syngnathus grayi GÜNTHER, Cat. Fish., VIII, 1870, p. 169, after Kaup's type of uncertain locality, possibly Australia.

D. 20. Rings 18 + 35. Base of dorsal fin elevated. Snout less than half head, with series of minutes spines; forehead high, its profile abruptly descending toward snout. Occiput and neck elevated into a crest; eyes large, prominent; edge of orbit rough. Opercle with radiating striæ and a strong ridge bent upward; humerus with a trihedral prominence. Body not deeper than broad; shields without spines, but the ventral edges of the caudal rings forming a pouch horizontally dilated. Tail half longer than the body. Vent below middle of dorsal, which stands on four rings. Caudal very small. Egg pouch half length of tail. A deep brown spot on side of fourth body ring. (Günther.)

Coasts of Japan and southward, rare; recorded from Nagasaki by Bleeker. Not seen by us. We use the name *koilomatodon* as being prior to the adoption of *grayi* by any author, and also as its type is certainly of Japanese origin. (κοίλωμα, a hallowed place; οδονς, tooth.)

8. UROCAMPUS Günther.

Urocampus GÜNTHER, Cat. Fish., VIII, 1870, p. 179 (*nanus*).

Pipe-fishes, with the dorsal on the tail far behind the vent. Body elongate, compressed, with distinct longitudinal ridges; upper edge of trunk continuous with that of tail; lateral line continuous with lower caudal edge. Tail elongate, very slender, quadrangular, tapering, the last rings very small; pectoral developed. Dorsal entirely on the tail.

(οὐρά, tail; κάμπος, abbreviation for Hippocampus.)

9. UROCAMPUS RIKUZENIUS Jordan and Snyder, new species.

(Plate VII.)

Head 11½ in length, 2⅘ in trunk; depth 2½ in head; snout 2¼; eye 6½; dorsal 16, on 5 rings; anal rings 11 + 59.

Body short; the depth anterior to anal opening about equal to length of snout; tail long, very slender, tapering to an extremely small caudal

peduncle. Snout scarcely lower than forehead; its depth equal to diameter of eye; chin with two slender barbels, slightly longer than diameter of eye. Supraorbital ridges converging to median ridge of snout; lateral ridges of snout converging above at the tips. Opercle with divergent striæ, a ridge near the middle and one along its upper edge. Occiput with a low, three-lobed, median ridge. Dorsal keels of body continuous with those of tail; lateral keels of body continuous with the ventrolateral keels of tail; median line of belly with a high, narrow keel; under part of tail with a low ridge.

Distance from dorsal to vent 5⅓ times in tail; the height of dorsal about equal to depth of tail at base of fin; its base with a low ridge. Length of pectoral somewhat greater than the diameter of eye. Anal very small. Caudal minute, scarcely discernible.

Color dark brown, with white spots along the edges of each ring, these more conspicuous on tail, forming cross-bands; a dark streak along median line of belly.

A single specimen 119 millimeters long, type No. 6520 Leland Stanford Junior University Museum, taken in Matsushima Bay. It is very close to *Urocampus nanus*, described from a single female specimen from Manchuria; but that species has the rings 11 + 50, apparently no barbels, a smooth operculum, and no anal fin, characters which, if authentic, may be of generic value.

(Rikuzen, the province in which Sendai and Matsushima are located.)

9. GASTEROTOKEUS Heckel.

Gasterotokeus HECKEL in Kaup, Lophobranchiate Fish, 1856, p. 18 (*biaculeatus*).
Syngnathoides BLEEKER, Nat. Tydskr. Ned. Ind., II, p. 259 (*blochi*).

General form of *Syngnathus*, but the tail finless and prehensile. Body depressed, the lateral line running along the margin of the abdomen. Shields smooth. Tail shorter than the rest of the body. Pectorals present. Males carrying the eggs embedded in the soft membrane of the abdomen without a pouch.

(γαστήρ, belly; τόκος, fœtus.)

10. GASTEROTOKEUS BIACULEATUS (Bloch).

Syngnathus biaculeatus BLOCH, Ichthyol., IV, 1787, p. 10, pl. CXXI, figs. 1, 2, East Indies.

Gasterotokeus biaculeatus KAUP, Lophobr., 1856, p. 19, Canton, Malayan Fishes, 1850, p. 387.—GÜNTHER, Cat. Fish., VIII, 1870, p. 194, Zanzibar, Seychelles, Singapore, Amboyna, Celebes, Philippines, China Sea, Cape York.—DUMÉRIL, Hist. Poiss., II, 1870, p. 528; Amboyna, Nias, China, Red Sea, Zanzibar, Madagascar.—GILL, Proc. Ac. Nat. Sci. Phila., 1859, p. 149; Shimoda.—ISHIKAWA, Prel. Cat., 1897, p. 4, Miyakoshima.

Gasterotoceus biaculeatus, DAY, Fish. India, pp. 6, 81, pl. CLXXIV, fig. 5; Fish. Brit. India, II, p. 467.

Syngnathus tetragonus GMELIN, Syst. Nat., I, 1788, p. 1453, after Bloch.

Syngnathoides blochii BLEEKER, Nat. Tydskr. Ned. Ind., II, p. 259.

Solegnathus blochii BLEEKER, Verh. Bat. Gen., XXV, p. 24.

Rings 18 + 45 to 55. D. 40 to 45; P. 17 to 23. Head 2 in trunk; tail shorter than trunk. A more or less distinct space on upper margin of orbit. A blunt prominence on occiput. Origin of dorsal nearly opposite vent, its base covering ten rings; usually a small barbel on mandible; adult sometimes with minute filaments along lower side of head, body, and tail. (Günther.)

Color pale green or brown, orange below, a pale spot edged with vermilion on each body-ring; lower side of head with dark markings. (Day.)

East Indies, common, rarely north to Japan; one specimen taken at Shimoda by Commodore Perry's expedition; a specimen from Miyako-shima in the Imperial Museum of Tokyo; none taken by us. (*bis*, two; *aculea*, spine.)

10. ACENTRONURA Kaup.

Acentronura Kaup, Lophobranchiates, 1856, p. 18 (*gracilissima*).

Small slender sea-horses, without coronet. Trunk slightly compressed; tail prehensile and finless. Occiput compressed into a crest, without coronet. Shields without spines. Pectoral fins present. Edge of trunk continuous with that of tail. Egg pouch as in *Hippocampus*, at base of tail.

(*α*—, without; *κέντρον*, spine; *οὐρά*, tail.)

11. ACENTRONURA GRACILISSIMA (Schlegel).

Hippocampus gracilissimus Schlegel, Fauna Japonica, Poiss., p. 274, pl. cxx, fig. 6, Nagasaki.

Acentronura gracillima Kaup, Lophobr., 1856, p. 18, Nagasaki (rings 42 to 45).—Günther, Cat. Fish., VIII, 1870, p. 198, after Schlegel.—Duméril, Hist. Nat. Poiss. II, 1870, p. 527, after Schlegel.—? Day,[1] Fish. India, p. 681, pl. clxxvi, fig. 1; ? Fish. Brit. India, II, p. 467, Andamans.—Nystrom, Handl. Svensk. Vet. Akad., 1887, p. 47, Nagasaki.

Head $1\frac{2}{3}$ in trunk; head and trunk $1\frac{1}{2}$ in tail; rings 13 + 45 or 46 (41 to 45, Day). D. 16; P. 12; A. 3. Snout $2\frac{2}{3}$ in head; eye $1\frac{1}{2}$ in snout; 2 in postorbital part of head. Egg pouch on 13 plates; dorsal on 4 rings; two on tail; its base with a prominent elevation. Dorsal ridges of body continuous with those of tail. Suborbital ridges very prominent, joining above the snout to form a triangular crest, then spreading out to form a triangular figure above snout. Occiput divided by a depression; body slightly thicker than head.

Color brownish, with small pale dots and dark markings; dorsal with groups of small blackish dots, forming a dark crossband.

Coast of Japan, rare; one fine male specimen 62 millimeters long obtained off Misaki in the Kuro Shiwo (*gracilimus*, very slender).

[1] The two specimens from the Andamans dredged by Mr. J. Wood-Mason are described by Dr. Day as having 13 + 41 to 45 rings.

11. HIPPOCAMPUS Rafinesque.

SEA-HORSES.

Hippocampus RAFINESQUE, Indice d'Ittiologia Siciliana, 1810, p. 37 (*hippocampus*).
Hippocampus LEACH, Zool. Misc., 1814, p. 103 (*hippocampus*).

Body strongly compressed, the belly gibbous, tapering abruptly to a long, quadrangular, prehensile tail. Head with a distinct curved neck, placed nearly at a right angle with the direction of the body, surmounted by a compressed occipital crest, on the top of which is an angular, star-shaped coronet; top and sides of the head with spines. Physiognomy remarkably horselike, like that of a conventional "knight" at chess. Body and tail covered with bony plates, forming rings, those on the body each with six spines or tubercles, those on the tail with four. Pectoral fins present, short and broad; anal minute, usually present; dorsal fin moderate, opposite the vent. Egg pouch in the male a sac at the base of the tail, terminating near the vent. Species numerous in all warm seas. They attach themselves by their tails to seaweed and other floating substances, and are often carried to great distances by currents.

(ἱππόκαμπος, the ancient name, from ἵππος, horse; κάμπος, a wriggling sea monster, or a caterpillar.)

a. Dorsal fin long, of 15 to 18 rays.
 b. Snout long, 2 to 2⅓ in head; coronet low.
  c. Spines of neck and body low, much lower than coronet; size large.
   d. Spines on body not enlarged at intervals, the rings being each similar to its neighbor; rings 11+39; color brown, with white streaks and specks. *kelloggi.* 12
   dd. Spines on body enlarged at intervals, the rings being not uniform; rings 11+33 to 36.
    e. Snout equal to postorbital part of head; spines obtuse; color jet black, with grayish bands and spots ..... *aterrimus.* 13
    ee. Snout longer than postorbital part of head; spines rather sharp; color brown, variously blotched and spotted ..... *kuda.* 14
  cc. Spines of neck and body very high, the longest as high as coronet; color brown, with white dots; snout with brown rings ..... *histrix.* 15
 bb. Snout short, nearly 3 in head; size small.
   f. Coronet very low, compressed, without filaments; spines very low, blunt; tail very slim; color brown, plain or irregularly banded. *japonicus.* 16
   ff. Coronet high, compressed, first laterally then longitudinally, with filaments; spines all high, many of them filamentous; color greenish gray, with darker markings ..... *sindonis.* 17
aa. Dorsal fin short, of 10 to 13 rays; size small; coronet high; spines high, some of them filamentous.
   g. Snout short, nearly 3 in head; coronet compressed, notched, the anterior part with long filaments. No small spine before each large supraorbital spine; body and tail banded with dark ... *mohnikei.* 18
   gg. Snout long, slender, about 2½ in head, as long as postorbital part of head; coronet very high, pedunculate, not notched crosswise, its tip ending in about 6 lobes or spines; color various, usually with small light or dark dots or streaks ..... *coronatus.* 19

12. HIPPOCAMPUS KELLOGGI Jordan and Snyder, new species.

Ō-UMI-UMA (GREAT SEA-HORSE).

(Plate VIII.)

Hippocampus longirostris SCHLEGEL, Fauna Japonica, Poiss., 1847, p. 273, Nagasaki, (not of Cuvier).—GÜNTHER, Cat. Fish., VIII, 1870, p. 202, China, Formosa.—NYSTROM, Handl. Svensk. Vet. Akad., 1887, p. 47, Nagasaki.—ISHIKAWA, Prel. Cat., 1897, p. 4, "Japan."

Head 1½ in trunk; trunk 2 in tail. D. 17; P. 18. Rings 11+39, each of them essentially similar to its neighbors, none of them especially enlarged. Snout long, as long as from posterior margin of orbit to knob above gill opening. Eye about 3 in snout; supraorbital spine simple, not divided; no spine on median line before eye. Depth of body at tenth ring 1½ times snout. Dorsal on 3½ rings (1½+2). Egg pouch on 7 rings. Coronet low, about as high as eye, slanting backward and with 6 diverging blunt spines; spines of body all low and obtuse; no filaments.

Color uniform yellowish brown or leather-color; with small scattered spots and short streaks of white on sides of head and trunk, most numerous about eyes; dorsal with a dark cross shade.

Coasts of Kiusiu, not common, and known to us from a large dried example, 8 inches long, from Kagoshima.

Type.—No. 6521, Leland Stanford Junior University Museum, presented by the Imperial University, and collected by Professor Mitsukuri.

This is evidently the *Hippocampus longirostris* of Schlegel, but not of Cuvier, whose species is based on a figure of Willughby. It is close to *H. kuda*, but differs, at least, in the greater number of rings and in their uniformity. (Named for Prof. Vernon Lyman Kellogg, of Stanford University.)

13. HIPPOCAMPUS ATERRIMUS Jordan and Snyder, new species.

KURO UMI-UMA (BLACK SEA-HORSE).

(Plate IX.)

Head 1½ in trunk; tail twice as long as trunk; D. 17. P. 16. A. 4. Rings 11+36. Egg pouch of male on 9 rings. Length of snout equal to postorbital part of head; eye 3 in snout, equal to depth of snout. Body very deep, the depth of tenth ring twice snout. Spines low and blunt, without filaments, those on first, fourth, and seventh body rings more prominent, also on first, fifth, eighth or ninth, and twelfth or thirteenth rings of tail. This character variable. Spines below dorsal not higher than others. Supraorbital spines blunt and low, pointing outward and slightly backward, notched or rather with a low

protuberance before each. A small blunt spine before eye. Coronet low, obliquely truncate, with three knob-like processes posteriorly, pointing backward. Base of dorsal elevated on $1\frac{1}{2}+1\frac{1}{2}$ rings.

Color purplish black, almost inky; grayish marblings along the prominent rings on body and tail, forming irregular crossbars. Grayish streaks on gill covers and other parts of head; tips of spines and warts grayish; dorsal with a blackish terminal band; dark streaks along each ray; pectoral and anal with a dark cross band.

East Indies north to Japan. Known to us from six specimens, all alike, black, taken by Capt. Alan Owston, at Yaeyama, in the Ishigaki Islands, Riukiu. These are from 90 to 140 millimeters long.

Type. No. 6516, Leland Stanford Junior University Museum.

This agrees in general with the accounts of *Hippocampus kuda* Bleeker, from the East Indies (wrongly called *H. guttulatus*), but that species has 11+33 rings, and typical specimens differ greatly in color from our specimens. The original account of *H. melanospilus* by Bleeker differs equally. We may therefore provisionally regard our examples as distinct.

(*Aterrimus*, very black.)

14. HIPPOCAMPUS KUDA Bleeker.

Hippocampus kuda Bleeker, Nat. Tyds. Ned. Ind., III, 1852, p. 82, Singapore.—Bleeker, Verh. Bat. Gen., XXV, p. 26.—Duméril, Hist. Nat. Poiss., II, p. 506, after Bleeker.

Hippocampus moluccensis Bleeker, Nat. Tyds. Ned. Ind., III, 1852, p. 305, Molucca.

Hippocampus tæniopterus Bleeker, Nat. Tyds. Ned. Ind., III, 1852, p. 306.

Hippocampus polytænia Bleeker, Nat. Tyds. Ned. Ind., III, 1852, p. 338, Floris.

Hippocampus comes Kaup, Lophobr., 1856, p. 10 (not of Cantor).

Hippocampus punctulatus, *guttulatus* and *moniekei* Günther, Fish. Zanzibar, p. 139, Zanzibar (not of authors).

Hippocampus guttulatus (part of authors) Günther, Cat. Fish., VIII, 1870, p. 202 (Zanzibar, Amboyna, Red Sea, Floris) (not of Cuvier, *H. hippocampus* from Venice).—Ishikawa, Prel. Cat., 1897, p. 4, Kagoshima, Miyakoshima.

Head $1\frac{1}{2}$ in trunk; trunk $1\frac{4}{5}$ in tail; rings, 11 + 35. D. 17; P. 16. Snout as long as from eye to knob above gill opening. Eye 3 in snout; snout $1\frac{1}{2}$ in depth of body; dorsal on, $1\frac{1}{2}+1\frac{1}{2}$ rings. Supraorbital spine simple, pointed outward and slightly backward. Body more slender than in *H. aterrimus*, the snout longer. The spines much more prominent and somewhat acute, arranged much as in *H. aterrimus*, with enlarged one on first, fourth, seventh, and eleventh body rings, and first, fifth, sixth, ninth, twelfth, and fifteenth tail rings; no filaments.

Color light-brown, with gray streaks and blotches; white lines radiating from eye and white streaks on snout and side of neck; the pale markings on side of body in our specimen suggest coralline patches; dorsal with a dark cross-shade.

East Indies; widely distributed, north to Riu Kiu Islands. This description is from a specimen 115 millimeters long, from Ishigaki, Yaeyama Island, Riukiu. We identify this specimen with *H. kuda* with some doubt, and we are not sure of the synonymy of the species, even if the identification be accepted. According to Dr. Day, the number of rings in *H. kuda* (*guttulatus*) is 11 + 33. The relations of this species to the other large-sized and long-nosed sea horses are still obscure.

(*Kuda*, a tube, in Japanese.)

15. HIPPOCAMPUS HISTRIX Kaup.

Hippocampus histrix Kaup, Lophobr., 1856, p. 17, pl. II, fig. 5, Japan.
Hippocampus hystrix Günther, Cat. Fish., VIII, 1870, p. 206, Zanzibar.—Duméril, Hist. Nat. Poiss., II, 1870, p. 514, Nagasaki, Ile of Reunion.

Dorsal rays 17 or 18. Snout thin, elongate, longer than rest of head, as long as distance from front of orbit to first nuchal spine; all the tubercles of body developed into long, slender, acute spines, those on certain rings longer than the others. Color pale, with numerous white dots; snout with broad dark rings; each spine black at tip. Length, 2½ inches. (Günther, Zanzibar specimens.) Kaup does not count the fin rays, and says that his specimen is uniformly colored.

In his figure the spines along the back are higher than the coronet, and 2½ to 3½ in length of snout; the coronet is very low, bifurcate at tip; spines on back of tail especially prominent; body slender.

East Indies; a few specimens known, recorded from Japan, Zanzibar and the Isle of Reunion, not seen by us.

(*Hystrix*, porcupine.)

16. HIPPOCAMPUS JAPONICUS Kaup.

KITA-NO UMI-UMA (NORTHERN SEA HORSE).

(Plate X.)

Hippocampus japonicus Kaup, Lophobr., 1856, p. 7, Nagasaki, Leyden Museum.—Duméril, Hist. Poiss., II, 1870, p. 505, same type.

Head 1⅔ (1½ to 1¾) in trunk; trunk 2 to 2½ in tail; D. 16 or 17; P. 11 or 12. Rings 11 + 39. Snout 2⅔ to 3 in head. Eye 1½ to 2 in snout. Snout 2 to 2½ in depth of body. Coronet from gill-opening, 1¼ to 1½ in snout. Dorsal covering 2 + 1½ rings. Prominent rings 1, 4, 7, 11 on the body; 5, 10, 15 on tail, these subject to considerable variation.

The body moderately deep, the tail very slim, the snout very short. Spines on body blunt and short. Coronet low, compressed, keel-like; supraocular spine low; no spine before eye. Spines at base of dorsal little enlarged. Length 2½ inches.

Color various. A specimen from Tokyo is light brown, with two black cross bands on body and four of different widths on tail; head

mottled; a dark bar at base of snout. Dorsal usually dusky with a pale median band. A specimen from Hakodate is leather brown, with dark markings on head; middle line of breast black; tail dark. A specimen from Onomichi is nearly uniform livid gray. One from Hakodate has almost no coronet.

The combination of low, keel-like coronet with the short snout and 16 dorsal rays at once distinguishes the species. Our numerous specimens are from Hakodate, Matsushima, Tokyo, Onomichi, and Wakanoura. The range of the species is farther to the northward than the others.

17. HIPPOCAMPUS SINDONIS Jordan and Snyder, new species.

(Plate XI.)

Head $1\frac{1}{3}$ in trunk; trunk 2 in tail. D. 15; P. 14. Rings 10 + 37. Snout short, its length $2\frac{1}{5}$ times in head. Eye $1\frac{3}{4}$ times in snout. Depth of trunk $1\frac{1}{2}$ times snout. Coronet high, almost as high as the length of snout. It is laterally compressed up to its middle, ends anteriorly in an acute triangular spine with a filament, also terminates posteriorly in an acute spine, without filament. From the middle up it is longitudinally compressed, giving rise to a laterally expanded, fan-like process, with five spines, pointing upward; the one next to each end with a filament. Supraorbital spines very prominent, with filaments and a distinct minor spine in the immediate front of each, all pointing anteriorly, large ones slightly outward as well; a well-marked spine on median line before eyes. Tubercles on body rather high, those in first, fourth, seventh, and tenth body rings, and second, fourth, sixth, eighth, tenth, and thirteenth tail rings enlarged and with filaments. The raised dorsal fin on $1\frac{1}{2} + \frac{1}{2}$ rings. Pectorals very much developed.

Color greenish gray, with irregular darker markings on body and tail. Head mottled with dark gray on greenish ground, interspersed with light cross bars and streaks. Middle line of belly black. Fins dusky, unmarked except the dorsal, which has a dark band longitudinally. Egg pouch occupies seven rings, greenish and covered with prickle-like processes.

This species is known from one small specimen, an adult male 38 millimeters long, type No. 47930 U. S. National Museum, dredged by the U. S. Fish Commission steamer *Albatross* in Totomi Bay, off Hamamatsu, in the province of Totomi, Japan. The species is allied to *H. mohnikei*, but differs in the form of coronet, the number of fin rays, and slimness of body, and also its size, which is much smaller than the smallest specimen of *mohnikei*.

(Named for Michitaro Sindo, late of Yamaguchi, assistant curator of fishes in Stanford University.)

18. HIPPOCAMPUS MOHNIKEI Bleeker.

(Plate XII.)

TATSU-NO-OTOSIGO (DRAGON'S CHILD).

Hippocampus brevirostris SCHLEGEL, Fauna Japonica, p. 274, Nagasaki, not of Cuvier (*H. hippocampus*).

Hippocampus mohnikei BLEEKER, Verh. Ak. Met. Amst., 1851, pp. 7, 16, Kaminoseki Island, Prov. Suwo, Inland Sea.—KAUP, Lophobr., 1856, p. 8, Nagasaki, coll. Von Siebold.—GÜNTHER, Cat. Fishes, VIII, p. 206, after Bleeker.—DUMÉRIL, Hist. Nat. Poiss, II, 1870, p. 521, after Bleeker.—ISHIKAWA, Prel. Cat., 1897, p. 4, Boshu (Awa), near Tokyo.

Head $1\frac{1}{2}$ in trunk; trunk $1\frac{1}{2}$ to 2 in tail. D. 11-13; P. 10-12. Rings 10 + 36 or 37. Egg pouch on 6 rings. Eye $2\frac{1}{3}$ in snout. Snout $2\frac{3}{4}$ in head, 2 to $2\frac{1}{3}$ in depth of body, as long as from front of orbit to postorbital spine. Coronet 2 to $2\frac{1}{4}$ in snout; dorsal on $2\frac{1}{3}$ rings. First, fourth, seventh, and tenth body rings, and third, sixth, tenth, and thirteenth tail rings prominent.

Coronet high, compressed, divided; the anterior part with long filaments, the posterior with 5 or 6 spines. Supraorbital spines simple, high, each with a long filament, and with or without a small spine before the large one; a median spine before eye. Snout short, thick. Spines on body high, the long ones on back and tail each with a long filament.

Color gray, with 8 to 10 faint, dark cross bands; snout pale; dorsal with a dark band and a pale edge. Young with the band more distinct. Southern Japan, north to Tokyo. Known to us from two specimens from Misaki, about 83 and 55 millimeters long; and one, 90 millimeters long, from Enoura on Suruga Bay, presented by the Imperial University. This latter and the smaller one from Misaki are both light brown in color, with the dorsal bands, body bands, and median line on belly colored dark brown. In size the small Misaki specimen is less than two-thirds of the Enoura specimen, although both are full-grown adults.

The species is allied to *H. coronatus*, but has the snout much shorter, and the coronet lower and of a peculiar form.

(Named for the discoverer, Dr. O. G. B. Mohnike.)

19. HIPPOCAMPUS CORONATUS Schlegel.

TSUNO-UMIUMA (HORNED SEA-HORSE).

Hippocampus coronatus SCHLEGEL, Fauna Japonica, Poiss., 1847, p. 274, pl. CXX, fig. 8, Nagasaki.—KAUP, Lophobr., 1856, p. 16, Nagasaki.—GÜNTHER, Cat. Fish., VIII, 1870, p. 205, after Schlegel.—DUMÉRIL, Hist. Poiss., II, 1870, p. 520, after Schlegel.—ISHIKAWA, Prel. Cat., 1897, p. 4, Tokyo.

Head $1\frac{1}{2}$ to $1\frac{2}{3}$ in trunk; trunk $1\frac{2}{3}$ to 2 in tail; D. 13 or 14; P. 11. Rings 10 + 38 to 40. Snout slender, about as long as postorbital part

of head; eye 3 in snout; snout $1\frac{1}{2}$ to $1\frac{3}{4}$ in greatest depth of body. Coronet very high, pedunculate, not divided into two parts at the top; varying in form, its length from gill opening about equal to snout; its tip usually with six lobes or spines. Spines of head and body prominent, the coronet usually with a long filament; other spines occasionally prominent. First, fourth, and tenth body rings prominent, and usually the fourth, sixth, tenth, fourteenth, and sixteenth of the tail. Spines at base of dorsal especially long and prominent. Dorsal short, inserted on $1\frac{1}{2} + 1 = 2\frac{1}{2}$ rings; egg pouch on 7 rings.

Color various, usually light brown with dark dots and mottlings, sometimes with pale dots and streaks, sometimes with dark brown streaks, the ground color sometimes almost black; usually light or dark streaks on opercle. Dorsal generally with a blackish band and pale edge, sometimes streaked like the body.

Coasts of Japan, very common, in clear waters near shore. A small, slender sea-horse, varying considerably in form, and much in coloration, but always readily known by the very high coronet, the sculpture of which is subject to great variation. Our many specimens, 90 to 115 millimeters long, are from Matsushima, Tokyo, Misaki, Onomichi, and Wakanoura. They would seem at first glance to compose five or six different species.

(*Coronatus*, crowned.)

RECAPITULATION.

Suborder HYPOSTOMIDES.

Family 1. PEGASIDÆ.

1. *Zalises* Jordan and Snyder.

1. *umitengu* Jordan and Snyder Wakanoura.

Order LOPHOBRANCHII.

Family 2. SOLENOSTOMIDÆ.

2. *Solenostomus* Lacépède.

2. *cyanopterus* (Bleeker); Awa.
3. *paradoxus* (Pallas); Awa.

Family 3. SYNGNATHIDÆ.

3. *Syngnathus* Linnæus.

4. *schlegeli* (Kaup); Otaru, Mororan, Hakodate, Aomori, Matsushima, Tokyo, Misaki, Wakanoura, Tsuruga, Onomichi.

4. *Corythroichthys* Kaup.

5. *isigakius* Jordan and Snyder; Ishigaki Island.

5. *Yozia* Jordan and Snyder.

6. *wakanoræ* Jordan and Snyder; Wakanoura.

6. *Trachyrhamphus* Kaup.

7. *serratus* (Schlegel); Yokohama, Wakanoura, Nagasaki.

7. *Halicampus* Kaup.

8. *koilomatodon* (Bleeker).

8. *Urocampus* Günther.

9. *rikuzenius* Jordan and Snyder; Matsushima.

9. *Gasterotokeus* Heckel.

10. *biaculeatus* (Bloch).

10. *Acentronura* Kaup.

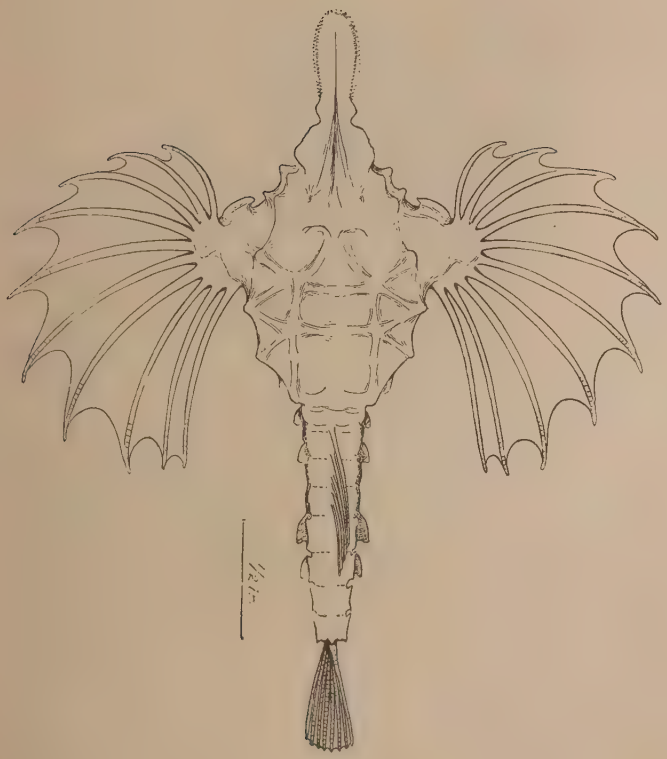
11. *gracilissima* (Schlegel); Misaki.

11. *Hippocampus* Rafinesque.

12. *kelloggi* Jordan and Snyder; Kagoshima.
13. *aterrimus* Jordan and Snyder; Ishigaki Islands.
14. *kuda* Bleeker; Ishigaki Islands.
15. *histrix* Kaup.
16. *japonicus* Kaup; Hakodate, Matsushima, Tokyo, Onomichi, Wakanoura.
17. *sindonis* Jordan and Snyder; Hamamatsu.
18. *mohnikei* Bleeker; Misaki, Enoura.
19. *coronatus* Schlegel; Matsushima, Tokyo, Misaki, Onomichi, Wakanoura.

ZALISES UMITENGU.

FOR EXPLANATION OF PLATE SEE PAGE 2.



ZALISES UMITENGU.

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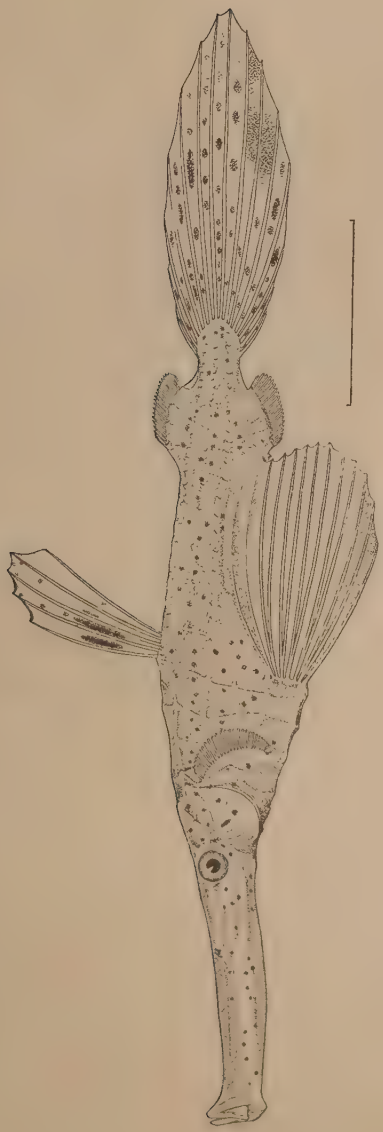
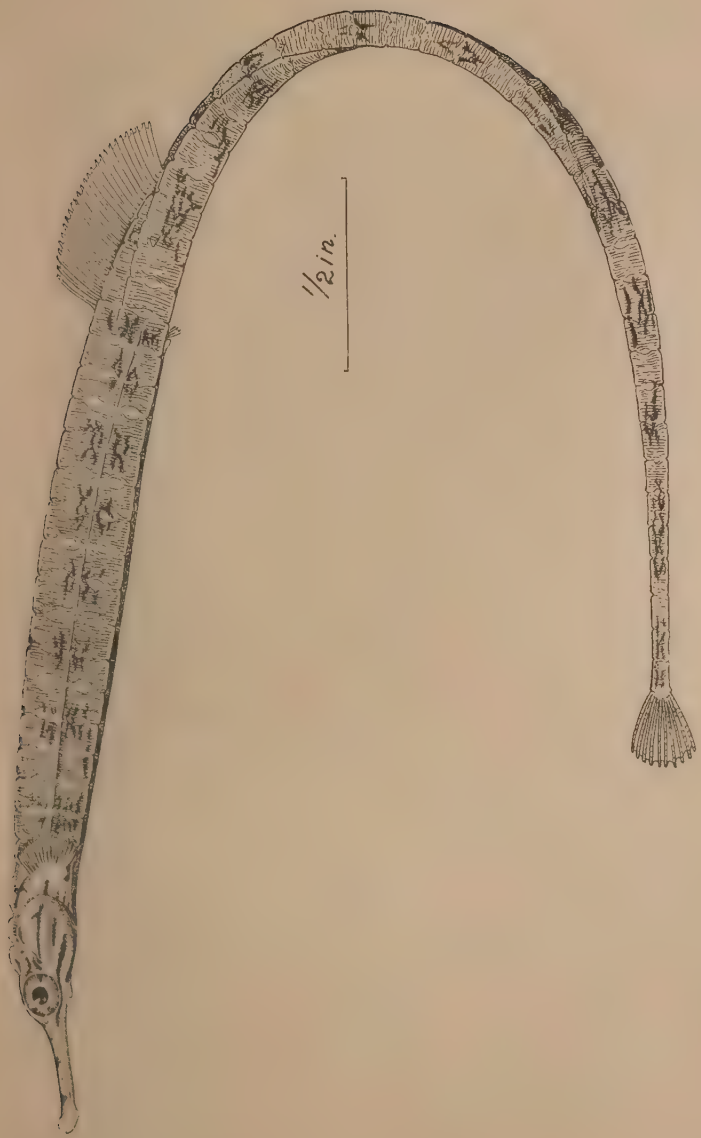


SOLENOSTOMUS CYANOPTERUS

FOR EXPLANATION OF PLATE SEE PAGE 4.

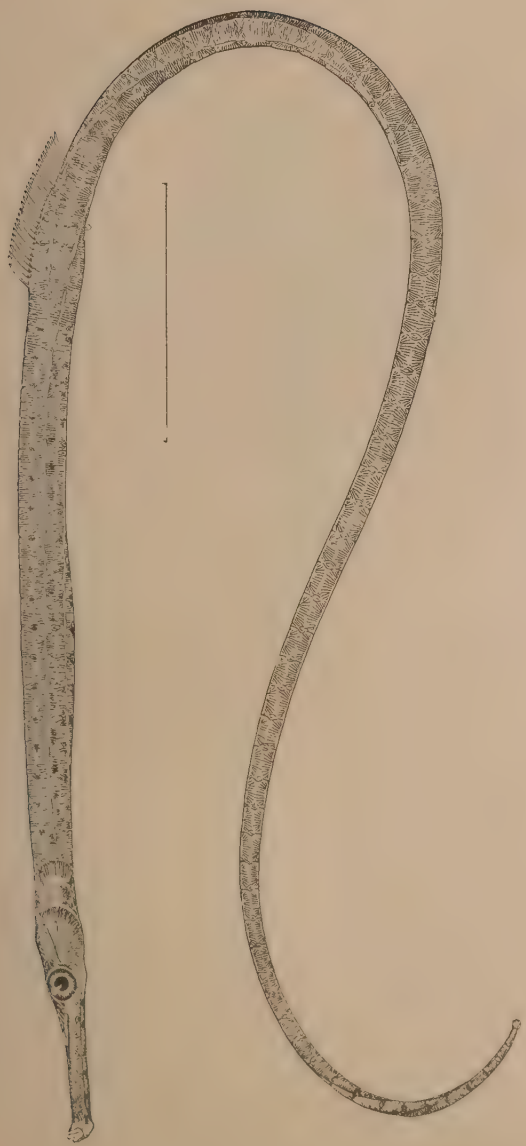
SOLENOSTOMUS PARADOXUS.

FOR EXPLANATION OF PLATE SEE PAGE 4.



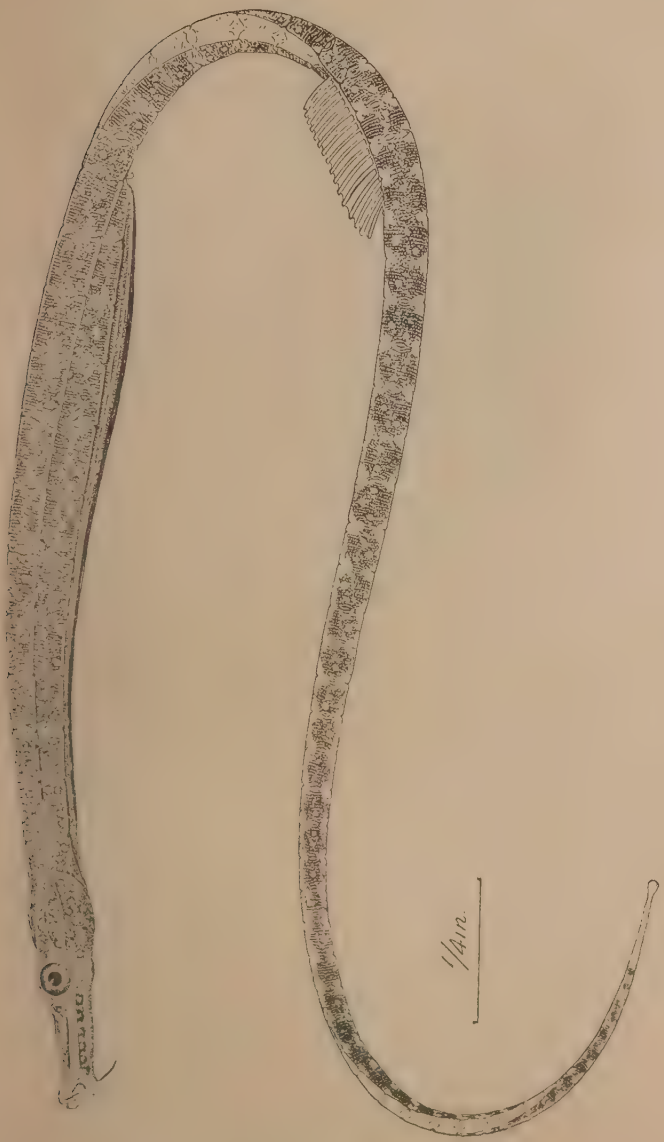
CORYTHROICHTHYS ISGAKIUS.

FOR EXPLANATION OF PLATE SEE PAGE 7.



YOZIA WAKANOURÆ.

FOR EXPLANATION OF PLATE SEE PAGE 8.



UROCAMPUS RIKUZENIUS.

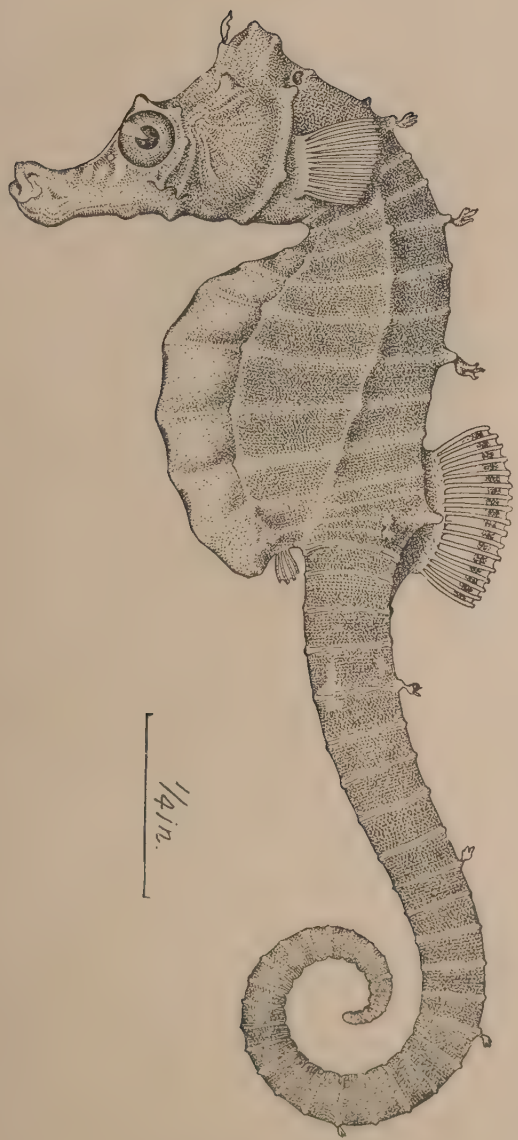
FOR EXPLANATION OF PLATE SEE PAGE 10.

HIPPOCAMPUS KELLOGGI.

FOR EXPLANATION OF PLATE SEE PAGE 14.

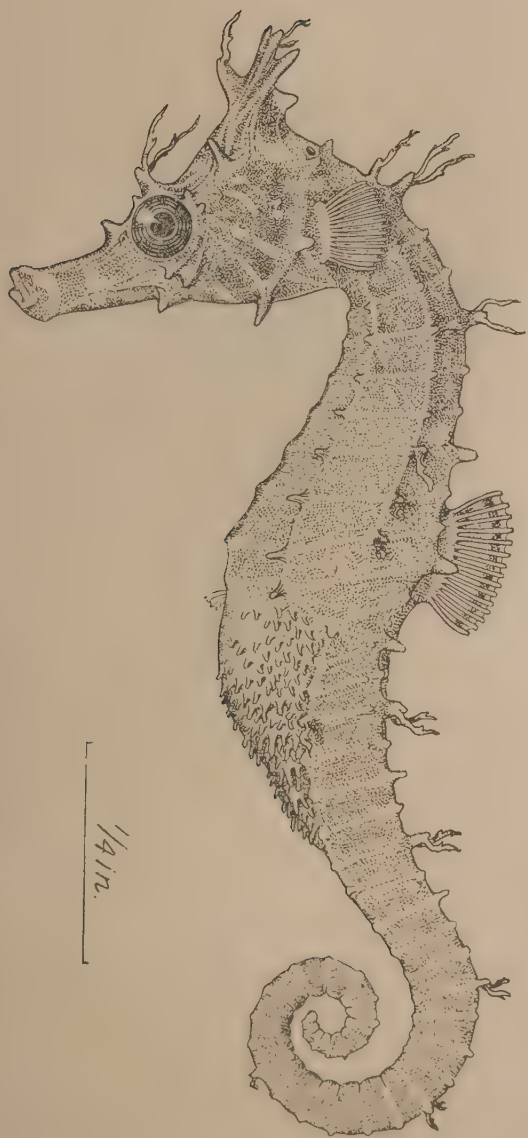
HIPPOCAMPUS ATERRIMUS.

FOR EXPLANATION OF PLATE SEE PAGE 14.



HIPPOCAMPUS JAPONICUS.

FOR EXPLANATION OF PLATE SEE PAGE 16.



HIPPOCAMPUS SINDONIS.

FOR EXPLANATION OF PLATE SEE PAGE 17.

HIPPOCAMPUS MOHNIKEI.

FOR EXPLANATION OF PLATE SEE PAGE 18.